Effect of Antioxidants like α-Tocopherol and Ascorbic Acid in arresting the progression of Diabetic Retinopathy and ascertain the Morphological changes in the Red blood cells as Oxidative Stress marker – A Randomized,Open Label , Comparative Pilot Study

Prof. Dr. B. Vasanthi M.D. (Guide),Dr. R. Lavanya (Final Yr PG in M.D. Pharmac)

ABSTRACT

INTRODUCTION :

Diabetic retinopathy , a debilitating microvascular complication of Diabetes, is the leading cause of acquired blindness. Oxidative stress, a cytopathic consequence of imbalance between the production and removal of free radicals is implicated in the pathogenesis of Diabetic retinopathy. Oxidative stress induced Haemolytic anaemia, vasospasm and chronic inflammation causes retinal ischaemia and progression of Diabetic retinopathy. Antioxidants like α-Tocopherol(Vitamin E) and Ascorbic acid (Vitamin C) scavenges free radicals and prevents the progression of retinopathy and also normalises the crenated red blood cells(RBCs).

AIMS AND METHODOLOGY:

This study aims to assess the effect of Vitamin E & C in arresting the progression of Diabetic retinopathy and correction of haemolytic anaemia using RBC morphology as biomarker of Oxidative stress.This study is an interventional, randomized, open label study conducted on 60 adult patients diagnosed as Non-proliferative diabetic retinopathy(NPDR) at Regional Institute Government Ophthalmic Hospital, Egmore. They were divided into two groups with 30 in each group. Control group received antidiabetic treatment only whereas study group received T.Vitamin C 500mg once daily and C. Vitamin E400mg twice daily for 12 weeks per patient. They were reviewed every 4 weeks for lab investigation, RBC morphology and Ophthalmic examination. They were followed up for a post-treatment period of 4 weeks. The obtained data were analysed using SPSS vs 21.

RESULTS:

There was a statistically significant reduction in the fasting blood glucose levels at the end of 12 weeks between two groups ($p<0.001$). There was also significant reduction in the number of patients with very severe and severe NPDR ($p=0.001$). 20% of study population showed improvement in visual acuity in contrast to 3.33% of control group at the end of the study. The mean percentage of crenated RBCs with Heinz bodies reduced significantly from 80.40% to 7.20% in study group compared to 82.57% to 82.33% in control group at the end of 12 weeks.

CONCLUSION:

Oxidative stress plays a vital role in the development of Diabetes and its complications like retinopathy. In this study, supplementation of antioxidants like Vitamin C & E showed that there was arrest in the progression of Diabetic retinopathy and there was also a significant improvement in visual acuity in the study group at the end of 12 weeks. Free radicals induced hyperglycaemia and crenated RBCs were also normalised after antioxidants intake in the study group. This proved the hypothesis that free radicals are responsible for Diabetic retinopathy and antioxidants like Vitamin E & C acts as disease modifying agents and improves quality of life in Type II diabetic patients.

Key words: Oxidative stress, Non-proliferatve Diabetic retinopathy, Vitamin C & E, RBC morphology